



SIEMENS

Technical
article

Professional start-up assistance: Network preconfigured – secured bottling faster

What to do, if the customer specifies industrial network technology, which oneself rarely uses? When the time or the personnel is lacking for an in-depth familiarization? Reject the project? A renowned manufacturer of beverage bottling plants has chosen Industrial Networks Professional Services from Siemens. The entire installation was preconfigured, thoroughly tested and delivered ready-to-use by the supplier – everything could then be implemented on-site by simple plug-and-play.

Today's high-performance beverage bottling plants are highly automated and have to run reliably around the clock. The demanded productivity and process transparency can now only be achieved with a powerful industrial communication network, which requires machine and plant manufacturers to have network know-how. If that is not the case, knowledge either has to be acquired – e.g., by assigning tasks to a specialized system integrator – or the job be rejected.

Comprehensive network know-how directly from the source

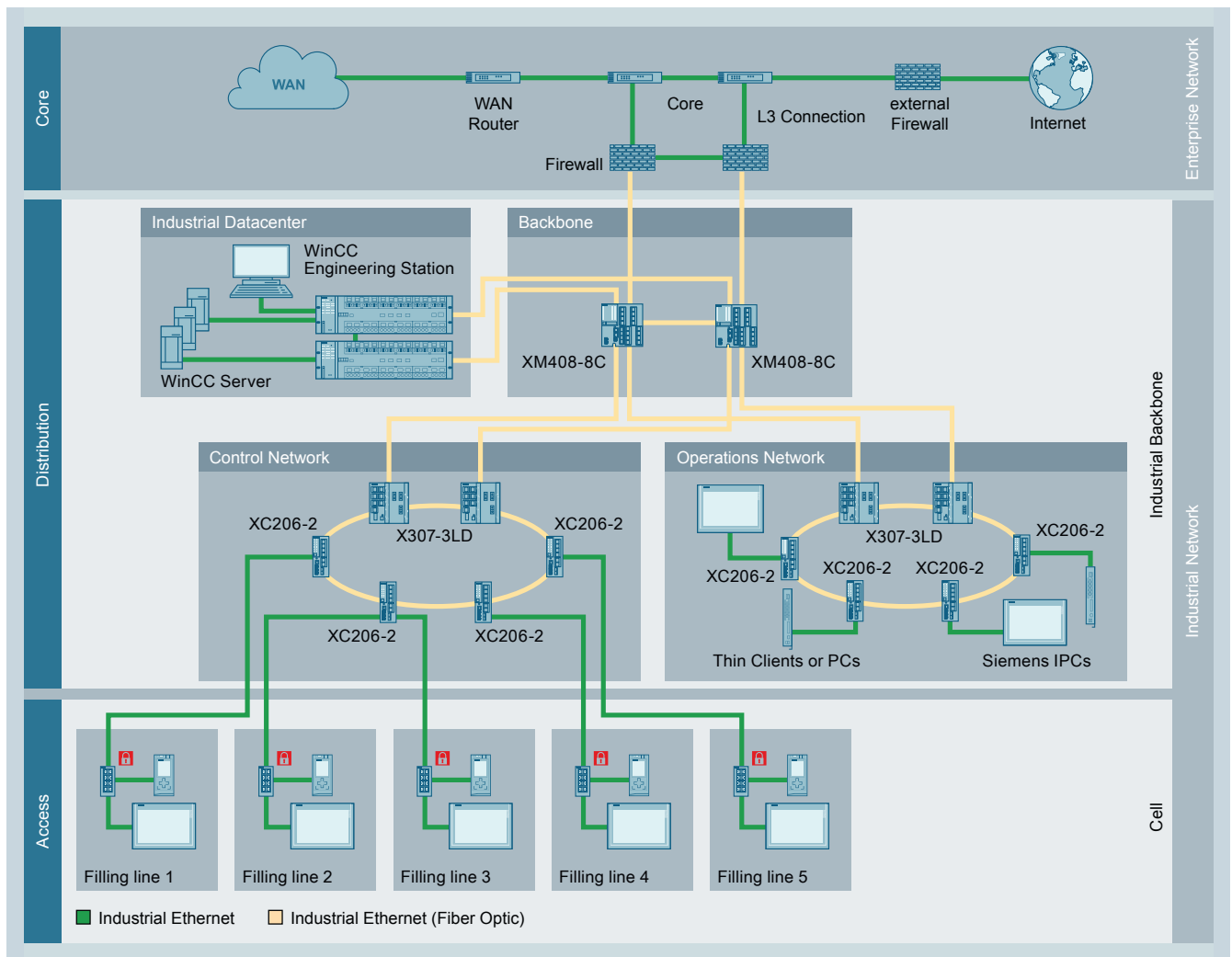
Anyone employing industrial communication networks from Siemens has an additional alternative concerning this matter: Professional Services for Industrial Networks. This refers to an individually scalable service offering and comprehensive network know-how directly from the source. It is aimed at manufacturers as well as operators of machines and plants that utilize products from the Siemens product families SCALANCE and RUGGEDCOM.

A minor – but for the procurement nevertheless crucial – part of these services was recently used by a renowned German manufacturer of beverage bottling plants in the context of a sizeable new installation overseas. Background: The customer already had good experiences with automation and network technology from Siemens as well as a precise idea of how the networking solution should look like. Supported by his local Siemens partner, the bottler himself planned the entire infrastructure and also specified the network components from the Siemens SCALANCE spectrum.

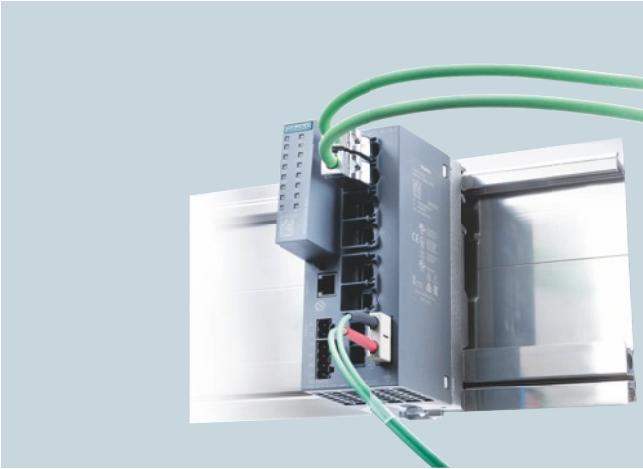
Redundancy demanded at all levels

The plant network was to be redundantly connected to two switches in the distribution layer of the routing-based corporate network, as well as to a redundant SCADA system based on SIMATIC WinCC in the central control room. Various redundancy strategies also were to be implemented below that.

Due to a lack of expertise in dealing with SCALANCE products and time for an in-depth familiarization, the plant manufacturer accepted the Siemens offering and involved a network specialist from the local Professional Services team. This network specialist re-examined the submitted concept and clarified the modalities directly with the operator. The communication solution with all components and connections was then set up, preconfigured and intensively tested in a laboratory at Siemens.



Planned by the user; configured and tested by Siemens Professional Services; and quickly implemented on-site by the plant manufacturer: Redundant network in this beverage bottling plant based on network technology from Siemens.



SCALANCE X Industrial Ethernet switches – scalable in performance – are the backbone of the automation network.

The link from the plant to the distribution layer and to the central control room consists of two redundant Industrial Ethernet switches of the SCALANCE X-400 managed product family. The modular devices enable the access to two physically separate – likewise redundantly set up – optical ring networks for the automation and visualization/maintenance of the bottling plant. The head of these ring networks consists of two SCALANCE X-300 switches each, while several SCALANCE X-200 compact switches connect the subordinate participants. On one side are the individual filling lines, on the other, Siemens IPCs and thin clients. Furthermore, both rings are segmented into several logical VLANs, and the communication takes place both via PROFINET and additional Industrial Ethernet communication. The physical separation of the networks in the field makes possible short cycle times in the automation union as well as the transport of larger amounts of data for the visualization – without the two network segments/subnets adversely affecting each other.

Individual configuration and simulation by specialists

Altogether, 14 SCALANCE switches – suitable for the respective tasks – were set up and connected, “filled” with the latest software, and individually configured. The Layer 3 functionality of the SCALANCE XM-400 devices could be activated by simply inserting a so-called key plug. The devices are connected via the virtual router redundancy protocol (VRRP) to form a logical unit – should one fail, the other one automatically takes over the operation. With the latest version of this protocol and the OSPF functionality (open shortest path first), switching times of less than one second could be achieved – meeting the requirements of the operator.

One layer below, at the switching centers and trunks of the redundant communication between the automation devices or the visualization systems at the field level, switches of the SCALANCE X-300 series are employed. Here, the high-speed redundancy protocol (HRP) and transmission rates of up to 1,000 Mbits/1 Gigabit enable switching times of less than 300 milliseconds. As a result, the connected SCALANCE X-200 switches can virtually seamlessly exchange data with each other and also with the above control level. This, too, was verified by means of different fault scenarios in the laboratory setup, and the plant manufacturer kept up to date at every stage of the project.

To finish, all settings, modifications and test types/results (throughput rates, switching times, ...) were documented in a comprehensive report, which also includes specific suggestions for improvement taking into consideration future expansions – so that the operator can quickly and correctly act when necessary.

After a late adaptation on end customer request, the pre-configured, ready-to-use SCALANCE switches were sent back to the plant manufacturer by courier service. Thanks to detailed labeling and documentation, the plant manufacturer was able to quickly install the switches in the plant control cabinets and ship them largely prewired. The integration and implementation into the network on-site was supported by a local specialist from Siemens Professional Services. Any maintenance work on the network technology during operation is handled by the bottler himself – knowing that in the event of unexpected problems, someone from Siemens could quickly be at his side and not just remotely. According to the persons in charge, this also is a strong argument for a supplier with global presence.

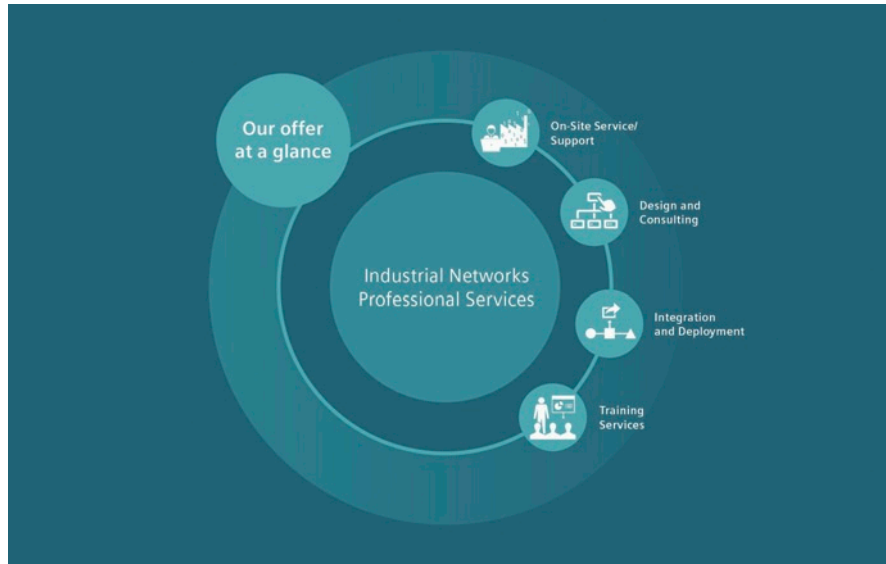
Integration and implementation

The preconfiguration and testing services minimize the risk of malfunctions or failures of the communication network. In addition, the implementation service ensures a quick commissioning and secure setup, as well as a smooth operation of the installation and the network.

Switch on and start to bottle

The machine and plant manufacturer was able to deliver the demanded network functionality on schedule and meet all of the customer requirements. If the manufacturer or a system integrator had to configure and test the network technology on-site – midst the usual hustle and bustle of the commissioning – a number of employees would have been busy with that for a much longer time.

All parties involved considered the collaboration to be very successful and professional. Optimal conditions then to also work together in future projects when it comes to network technology



With individually scalable Industrial Networks Professional Services, Siemens supports plant manufacturers as well operators in all aspects of industrial communication.

Security information

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept. For more information about industrial security, please visit <http://www.siemens.com/industrialsecurity>

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Professional Services: Comprehensive support in all aspects of industrial communication networks

Together with Siemens Solution Partners experienced in industry sectors and IT, Siemens offers coordinated Professional Services. The basis for a successful brownfield project includes a site inspection and analysis of already existing network structures – when employing IWLAN components also with radio coverage examination to eliminate interference. This results in a specific documentation with recommendations for the implementation. On request, experienced specialists advise on the design of the LAN and WLAN network infrastructures and mechanisms, and also assume the commissioning as well as the optimization on-site. This speeds up the implementation and in part enables a know-how transfer to the user. Furthermore, various standard and customized training courses provide sound product and network expertise. The user also obtains full project transparency as well as adherence to schedules when project coordination is assigned to the network supplier.

Professional Services: Preconfiguration and testing services

- Creation of configuration files for upload to the network components
- Preconfiguration of hardware prior to delivery according to project requirements
- Testing of devices prior to shipping (factory acceptance test – FAT)

Professional Services: Implementation service

- Configuration of hardware according to project requirements
- Equipment testing
- Installation and commissioning of SCALANCE and RUGGEDCOM network components by qualified partners and subcontractors